



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

58907

7590

11/23/2010

ROUND
LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK, LLP
600 SOUTH AVENUE WEST
WESTFIELD, NJ 07090

EXAMINER

HERNANDEZ, NELSON D

ART UNIT

PAPER NUMBER

2622

DATE MAILED: 11/23/2010

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,603	02/10/2004	Eric R. Fossum	ROUND 3.0-020 CON	1683

TITLE OF INVENTION: INTERPOLATOR FOR A CMOS IMAGE SENSOR USING A DIGITAL REGISTER

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	02/23/2011

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. **PROSECUTION ON THE MERITS IS CLOSED.** THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN **THREE MONTHS** FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. **THIS STATUTORY PERIOD CANNOT BE EXTENDED.** SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the SMALL ENTITY status shown above.

If the SMALL ENTITY is shown as YES, verify your current SMALL ENTITY status:

A. If the status is the same, pay the TOTAL FEE(S) DUE shown above.

B. If the status above is to be removed, check box 5b on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and twice the amount of the ISSUE FEE shown above, or

If the SMALL ENTITY is shown as NO:

A. Pay TOTAL FEE(S) DUE shown above, or

B. If applicant claimed SMALL ENTITY status before, or is now claiming SMALL ENTITY status, check box 5a on Part B - Fee(s) Transmittal and pay the PUBLICATION FEE (if required) and 1/2 the ISSUE FEE shown above.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
 or Fax **(571)-273-2885**

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

58907 7590 11/23/2010

ROUND
LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK, LLP
600 SOUTH AVENUE WEST
WESTFIELD, NJ 07090

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/774,603 02/10/2004

Eric R. Fossum

ROUND 3.0-020 CON

1683

TITLE OF INVENTION: INTERPOLATOR FOR A CMOS IMAGE SENSOR USING A DIGITAL REGISTER

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	NO	\$1510	\$300	\$0	\$1810	02/23/2011

EXAMINER	ART UNIT	CLASS-SUBCLASS
HERNANDEZ, NELSON D	2622	348-272000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. Use of a **Customer Number is required.**

2. For printing on the patent front page, list

- (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, 1 _____
 (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed. 2 _____
 3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE

(B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent): ☐ Individual ☐ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

- ☐ Issue Fee
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

4b. Payment of Fee(s): (Please first reapply any previously paid issue fee shown above)

- ☐ A check is enclosed.
☐ Payment by credit card. Form PTO-2038 is attached.
☐ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. Change in Entity Status (from status indicated above)

- ☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27. ☐ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature _____ Date _____
 Typed or printed name _____ Registration No. _____

This collection of information is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/774,603	02/10/2004	Eric R. Fossum	ROUND 3.0-020 CON	1683
58907	7590	11/23/2010	EXAMINER	
HERNANDEZ, NELSON D				
ART UNIT			PAPER NUMBER	
2622				

DATE MAILED: 11/23/2010

ROUND
LERNER, DAVID, LITTENBERG, KRUMHOLZ & MENTLIK, LLP
600 SOUTH AVENUE WEST
WESTFIELD, NJ 07090

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b) (application filed on or after May 29, 2000)

The Patent Term Adjustment to date is 924 day(s). If the issue fee is paid on the date that is three months after the mailing date of this notice and the patent issues on the Tuesday before the date that is 28 weeks (six and a half months) after the mailing date of this notice, the Patent Term Adjustment will be 924 day(s).

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (<http://pair.uspto.gov>).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

Notice of Allowability**Application No.**

10/774,603

Applicant(s)

FOSSUM, ERIC R.

Examiner

Nelson D. Hernández Hernández

Art Unit

2622

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to amendments filed on 10/21/2010.
2. ☒ The allowed claim(s) is/are 65-107 and 124-150 (Renumbered as 1-70).
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of the:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
(a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
(b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

/Nelson D. Hernández Hernández/
Primary Examiner, Art Unit 2622

DETAILED ACTION

Response to Amendment

1. The Examiner acknowledges the amended claims filed on May 21, 2010. **Claim 65** has been amended. **Claims 1-64 and 108-123** have been cancelled.

Election/Restrictions

2. Applicant's arguments, see pages 15-25, filed May 21, 2010, with respect to the Notice of Non-Compliant Amendment based on an Election by Original Presentation have been fully considered and are persuasive. The requirement for Election/Restriction of claims 65-107 and 124-150 **is hereby withdrawn as to any claim that requires all the limitations of an allowable claim**. Claims 65-107 and 124-150, directed to the embodiment of figs. 6 and 8 are no longer withdrawn from consideration.

In view of the above noted withdrawal of the restriction requirement, applicant is advised that if any claim presented in a continuation or divisional application is anticipated by, or includes all the limitations of, a claim that is allowable in the present application, such claim may be subject to provisional statutory and/or nonstatutory double patenting rejections over the claims of the instant application.

Once a restriction requirement is withdrawn, the provisions of 35 U.S.C. 121 are no longer applicable. See *In re Ziegler*, 443 F.2d 1211, 1215, 170 USPQ 129, 131-32 (CCPA 1971). See also MPEP § 804.01.

Allowable Subject Matter

3. **Claims 65-107 and 124-150 (Renumbered as 1-70)** are allowed.
4. The following is a statement of reasons for the indication of allowable subject matter:
5. **Regarding claims 65, 81, 93, 124 and 136 (Renumbered as 1, 81, 93, 124 and 136 respectively)**, the main reason for indication of allowable subject matter is because the prior art of record (Denyer et al., WO 97/35438 A1) teaches an imager (See fig. 7), comprising: a semiconductor substrate (*Denyer et al. discloses a semiconductor substrate by disclosing that the imager is part of a single chip camera and that the production process of the image sensor is well disposed to deposition of the color filters when the products are in silicon-wafer form. See fig. 7, page 16, lines 13-21*); an array of photosensitive sites (*Fig. 7: 23; see also fig. 1; page 11, lines 29-37; page 12, lines 1-8*) located on the substrate (*Note that the sensor array 23 is located on the single camera chip 20 as shown in fig. 7 (See page 18, lines 5-30; also page 12, lines 1-8). This teaches that the array of photosensitive sites is located on the substrate*), the array including a plurality of first photosensitive sites (*See fig. 1*) having a plurality of first color filters (*As shown in fig. 1, Denyer et al. discloses a checkerboard pattern filter for Red, Green, and Blue colors. For examination purposes, the Examiner is interpreting the Green color filters as the plurality of first color filters*) arranged above said first photosensitive sites to allow only a first spectral component of light to reach said first photosensitive sites (*Denyer et al. discloses that the pixels are covered with color filters corresponding to desired spectral components. See page 12, lines 1-8. See also fig. 1,*

which shows the arrangement of Red, Green and Blue colors. This teaches that the first sensitive sites are covered with a plurality of first color filters (corresponding to green color as interpreted by the Examiner) to allow only a first spectral component (Green) of light to reach said first photosensitive sites), wherein each first photosensitive site comprises a configuration enabling each first photosensitive site to measure the level of a first spectral component in light received (Green color components) by the respective first photosensitive site (See page 12, lines 1-19), and a plurality of second photosensitive sites having a plurality of second color filters (As shown in fig. 1, Denyer et al. discloses a checkerboard pattern filter for Red, Green, and Blue colors. For examination purposes, the Examiner is interpreting the Blue color filters as the plurality of second color filters) arranged above said second photosensitive sites to allow only a second spectral component of light to reach said second photosensitive sites (as discussed above, Denyer et al. discloses that the pixels are covered with color filters corresponding to desired spectral components. See page 12, lines 1-8. See also fig. 1, which shows the arrangement of Red, Green and Blue colors. This teaches that the second sensitive sites are covered with a plurality of second color filters (corresponding to Red color as interpreted by the Examiner) to allow only a first spectral component (Green) of light to reach said first photosensitive sites), wherein each second photosensitive site comprises a configuration enabling each second photosensitive site to measure the level of a second spectral component in light received (Red color components) by the respective second site (See page 12, lines 1-19), said second spectral component being different from said first spectral component (Note that the

Examiner is interpreting the first color component as Green and the second color component as Red, which are different from each other); and an interpolator (See processor subsystem 25 as shown in fig. 7. Denyer et al. discloses performing interpolation on the color components using low-pass filter 28 and also teaches performing interpolation for obtaining the luminance components of the captured image data. See page 18, lines 5-30; see also page 12, lines 10-37; page 13, line 8 – page 14, line 10; page 15, lines 1-20) located on the substrate (Denyer et al. discloses that the processor subsystem is located on the same chip as the array of photosensitive sites. See page 18, lines 5-30; also page 16, lines 13-21) and comprising a configuration enabling the interpolator to estimate the level of the first spectral component (Green color) in the light received by at least one of the second photosensitive sites (Photosensitive sites measuring a color other than Green (i.e. Red)) based on at least one measurement of the first spectral component obtained respectively by at least one of the first photosensitive sites (Denyer et al. discloses applying a low-pass filter (As shown in fig. 7: 28) to obtain the missing colors in a respective site. See page 12, lines 10-37. This teaches the use of at least one measurement of the first spectral component (Green color) to estimate the level of the first spectral component (Green color) in the light received by at least one of the second photosensitive sites since Denyer et al. discloses that by performing low-pass filter to the color components, a spatially smoothed version of the ideal color components (in this case Green color) is obtained (See page 12, lines 10-19). Denyer et al. also discloses that for luminance determination, the Green color component is calculated by

performing interpolation of Green color components surrounding sites that do not receive Green color to obtain the luminance component for said sites (See figs. 3 and 4; page 13, line 8 – page 15, line 20)); at least one serial register (Denyer et al. discloses a plurality of five-pixel registers (Fig. 7: 27)) for storing digital bit values representing the spectral component measurements from a photosensitive site being interpolated and the photosensitive sites neighboring the photosensitive site being interpolated (Denyer et al. discloses that a 5 X 5 block is read out from the memory by 5-pixel registers 27, the block including a photosensitive site being interpolated and the photosensitive sites neighboring the photosensitive site being interpolated. See page 12, lines 10-19; page 18, lines 5-30).

However, the prior art of record fails to teach or reasonably suggest at the time the invention was made, including all the elements presented in the present claim, that the register set, which is also in the substrate, is programmable or that can be set via an external interface to store at least a value so that the interpolator would operate depending on one or more values to be stored on the register set as claimed.

Contact

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nelson D. Hernández Hernández whose telephone number is (571)272-7311. The examiner can normally be reached on 9:00 A.M. to 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lin Ye can be reached on (571) 272-7372. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Nelson D. Hernández Hernández/
Primary Examiner, Art Unit 2622
November 14, 2010